

AMENDMENTS TO THE CLAIMS

Claim 1. (Previously Presented) A magnetic sensor comprising a giant magnetoresistive effect element having a spin valve film including a pinned layer, a conductive spacer layer, and a free layer comprising:

a bias magnet film composed of a permanent magnet for producing a bias magnetic field in the free layer in a predetermined direction so that the direction of magnetization in each magnetic domain in the free layer can be maintained in the predetermined initial state direction; and

an initializing coil that is provided in the vicinity of the free layer and applies to the free layer an initializing magnetic field in the direction same as the direction of the bias magnetic field by being energized under a predetermined condition so that the direction of magnetization in each magnetic domain in the free layer can assuredly be returned to initial state direction even if the direction of magnetization is disturbed by applying a strong magnetic field to the free layer.

Claims 2-9. (Cancelled)

10. (Previously Presented) A magnetic sensor according to Claim 1, wherein

said spin valve film of the giant magnetostatic effect element has a longitudinal direction; and

said bias magnet gives a constant bias magnetic field to the free layer in the longitudinal direction of the free layer in order to maintain uniaxial anisotropy of the free layer.

11. (Previously Presented) A magnetic sensor according to Claim 10, comprising:

a plurality of narrow zonal portions made of the spin valve film; and

a plurality of the bias magnet films,
wherein, each of the narrow zonal portions extends in the predetermined direction on the upper surface of each of the bias magnet films and joins to the adjacent narrow zonal portion so as to magnetically join to each of the bias magnet films at the upper surface of each of the bias magnet films.

12. (Previously Presented) A magnetic sensor comprising a giant magnetoresistive effect element having a spin valve film including a pinned layer, a conductive spacer layer and a free layer, the spin valve film having narrow zonal portions each of which extends in the longitudinal direction, comprising:

bias magnet films provided at both ends of the free layer in the longitudinal direction for producing in the free layer a bias magnetic field in the longitudinal direction of the free layer, whereby the direction of magnetization in each magnet domain in the free layer can stably be maintained in the predetermined direction when an external magnetic field is not present; and

initializing coils being energized under a predetermined condition to thereby generate an initializing magnetic field for returning the direction of magnetization in each magnetic domain in the free layer to the longitudinal direction of the free layer, whereby the direction of magnetization in each magnetic domain in the free layer can assuredly be returned to the initial state even if the direction of magnetization is disturbed by applying a strong magnetic field to the free layer.

Claims 13-16. (Canceled)